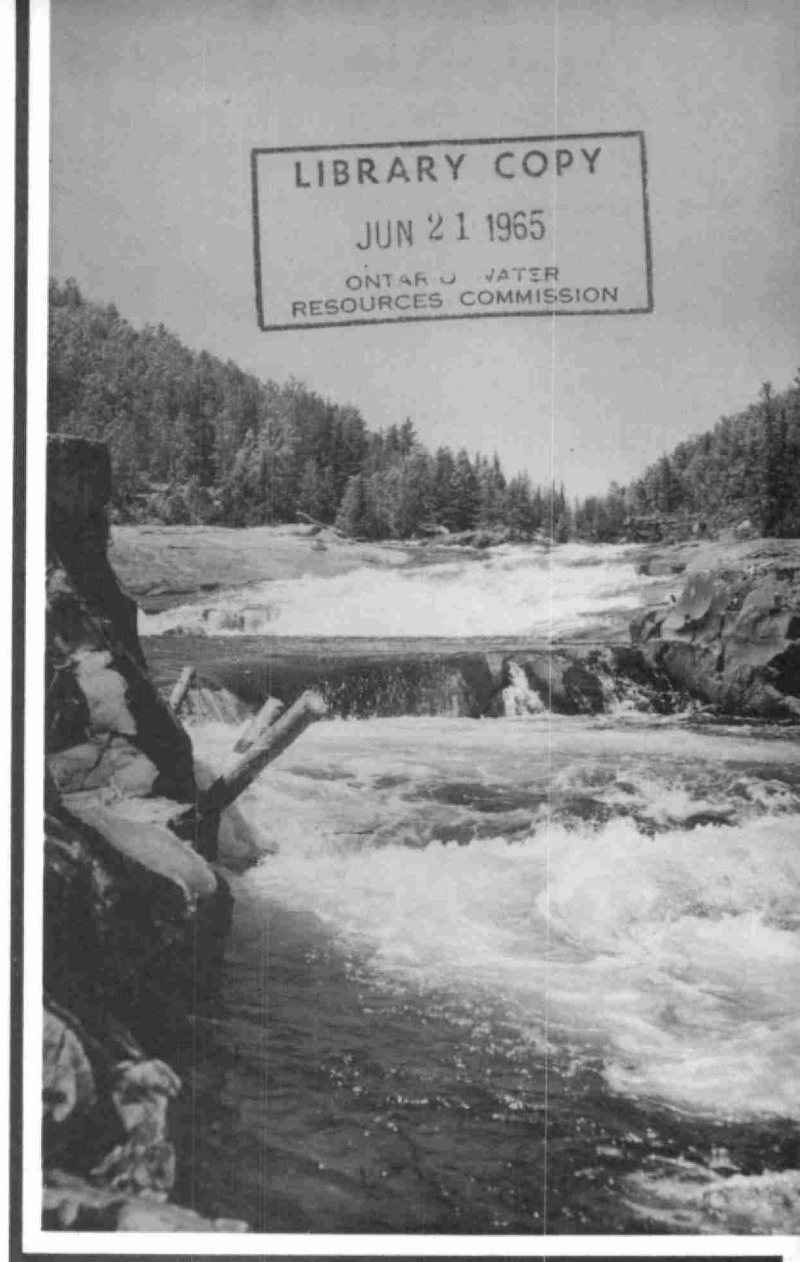


*Trenton
Sewage
Treatment
Plant*



1963 Annual Report

Ontario Water Resources Commission

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ONTARIO WATER RESOURCES COMMISSION
OFFICE OF THE GENERAL MANAGER

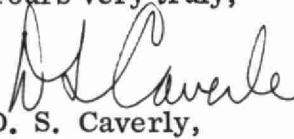
Mayor and Members of Council,
Town of Trenton.

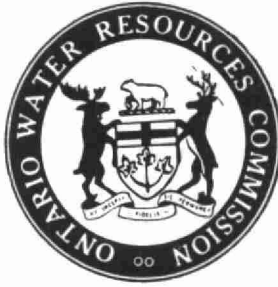
Gentlemen:

I am pleased to submit, for your information, the 1963 Annual Operating Report of the Trenton Sewage Treatment Plant, OWRC Project No. 57-S-4, which has been prepared by our Division of Plant Operations.

We are grateful for the kind cooperation which you and your staff have extended to our Operations staff throughout the year. We look forward to a continuing close association with you in our mutual endeavour to control pollution.

Yours very truly,


D. S. Caverly,
General Manager



General Manager,
Ontario Water Resources Commission.

Dear Sir:

It is with pleasure that I present to you the Annual Report of the operation of the Trenton Sewage Treatment Plant, OWRC Project No. 57-S-4 for 1963.

This report presents design data, outlines operating problems encountered and summarizes in tables, charts and graphs all significant flow and cost data.

Yours very truly,

B. C. Palmer,
Director,
Division of Plant Operations.

foreword

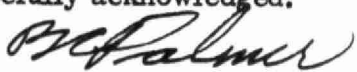


This report is designed to present the highlights of the operation of these works during 1963. Trends in flows and other operating data can be extremely useful in the development of necessary long range enlargement and improvement programs.

In addition to the activities reported herein, much unrecorded effort has contributed to the success of this operation. The municipality, through representatives on the Local Advisory Committee, have given valuable assistance in reviewing salary schedules, detailed operating budgets, personnel problems, flow patterns, and major maintenance problems.

The Division of Plant Operations has provided direction to the field staff in administrative procedures, quality control, maintenance schedules, equipment inspection and purchase supervision. A number of other Divisions of the Commission have been of service. The Division of Construction has offered helpful advice on equipment selection and renovation problems. The Division of Sanitary Engineering has maintained, through its District Engineering staff, a keen interest in the operation and has made a number of constructive recommendations. Its operator training courses have been very helpful. The Division of Finance has processed many payrolls, purchase orders and invoices dealing directly with this project. The Commission Personnel Director has been most helpful in the counselling of personnel problems.

The excellent cooperation of all of these groups is gratefully acknowledged.


B. C. Palmer,
Director,
Division of Plant Operations



DIVISION OF PLANT OPERATIONS

contents

Foreword.....	Page 1
View of Plant.....	Page 2
History.....	Page 3
Project Staff.....	Page 4
Description of Project.....	Page 5
Design Data.....	Page 7
Plant Flow Chart.....	Page 8
Process Data.....	Page 9
Operating Costs.....	Page 16
Summary.....	Page 18
Total Costs.....	Inside back cover

C. W. Perry
Assistant Director
D. McTavish
Regional Supervisor
J. N. Dick
Operations Engineer

TRENTON SEWAGE TREATMENT PLANT



OPERATED FOR
THE TOWN OF TRENTON

BY

THE ONTARIO WATER RESOURCES COMMISSION

CHAIRMAN

A. M. Snider

COMMISSIONERS

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J. A. Vance, LL. D., P. Eng.

A. A. Wishart, Q. C., M. P. P.

GENERAL MANAGER

D. S. Caverly

ASSISTANT GENERAL MANAGERS

G. M. Galimbert
L. E. Owers

COMMISSION SECRETARY

W. S. MacDonnell

1956^{to} 1963 History

INCEPTION

In 1956, the Town of Trenton and the Ontario Water Resources Commission initiated plans for the construction of a modern sewage treatment plant.

The firm of Gore & Storrie Limited, Toronto, Ontario, Consulting Engineers was engaged to prepare plans and specifications for the project.

APPROVAL

In 1957, the town signed an agreement with the Ontario Water Resources Commission to finance, construct and operate the plant.

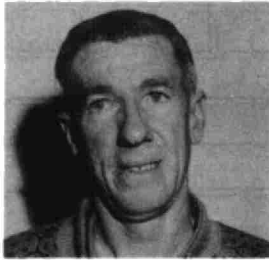
CONSTRUCTION

The construction of the project began in the spring of 1959. The plant was constructed by Bradford-Hoshal Associates Limited of Port Hope, Ontario and the Dundas Street pumping station was constructed by Bedford Construction Company of Toronto. By January 1960, the project was completed and the Division of Plant Operations began the operation of the project.

TOTAL COST

57-S-4	\$ 515,665.11
61-S-95	<u>194,179.87</u>
	\$ 709,844.98

Project Staff



J. Stewart
Chief Operator

COMMENTS

On October 31, 1961, Mr. James Stewart was employed as the Operator of the Trenton Sewage Treatment Plant.

Mr. Stewart has completed the three operators' courses which are available to operators through the Ontario Water Resources Commission. Mr. Stewart, therefore, has his certification as a sewage treatment plant operator.

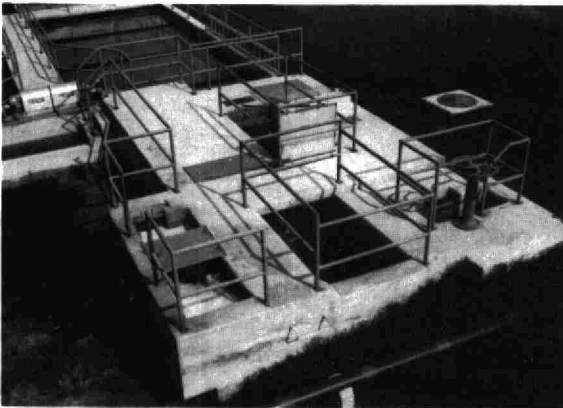
The operator should be complimented for his enthusiasm and interest in the operation of the plant.

Description of Project



The waste from the west side of the Trent River is conveyed under the river via a 24 inch concrete gravity sewer to the Dundas Street pumping station. Similarly, the waste from the east side of the Trent River is conveyed to the pumping station wet well via a 24 inch concrete sewer entering the north wall of the building.

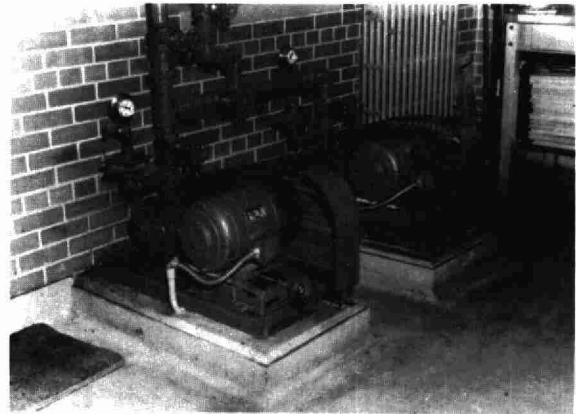
From the Dundas Street pumping station, the waste is transported to the treatment plant by a 16 inch force main.



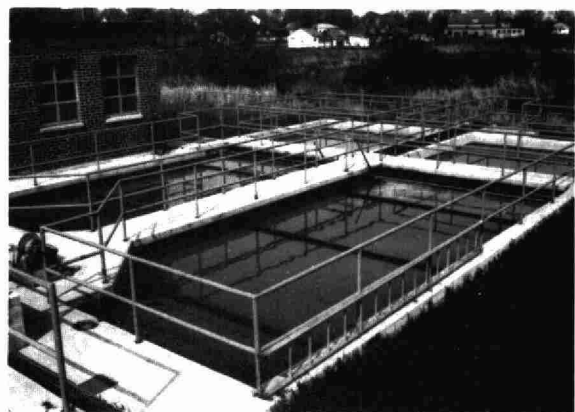
INFLUENT WORKS

Before the sewage enters the influent works, it passes through a Builders-Providence, Inc. venturi meter, where all flow to the plant is measured. The

sewage next enters the inlet chamber of the influent works and is there directed through a 24 inch sluice gate to the aerated grit chamber.

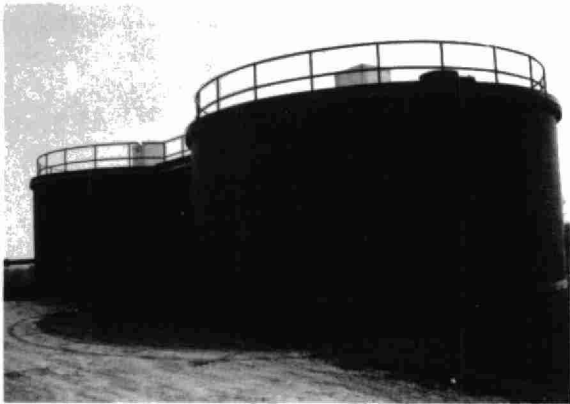


Compressed air is forced into the grit chamber in such a manner as to impart a roll to the tank contents. The velocity of the roll is controlled so that the grit material stays in suspension and passes through the grit chamber. The grit material is lifted by a four inch air pump into a decanting trough where the liquid and solid phases are separated. The washed grit is normally removed from the decanting trough and disposed of as sanitary land fill.



PRIMARY SEDIMENTATION TANKS
Two rectangular primary sedimentation

tanks, 52 feet in length, receive the sewage from the grit removal unit. It is retained in the sedimentation tanks for approximately three hours at design flow. Approximately 50 percent of the suspended solids in the incoming sewage settles to the bottom of the sedimentation tanks. Each sedimentation tank is equipped with a sludge scraper which moves the settled sludge to a hopper located at the front end of the tank. The sludge is then pumped automatically at a pre-set interval to the digestion tank.



SLUDGE DIGESTION TANKS

The Trenton plant utilizes two stage digestion. There are two digesters, one secondary tank of 28 feet in diameter. The piping to the digesters is so arranged that raw sludge can be pumped to either tank and digested sludge can also be removed from either tank.



Both digesters have fixed covers. The primary digester contents are mixed with compressed digester gas and also circulated through a Pacific flush tank heat exchanger.

Design—Data

GENERAL

Type of Plant - Primary treatment with provision for the extension to complete treatment.

Design Population - 12,000 persons. 15,000 persons when extended to complete treatment.

Design Plant Flow - 83.3 gallons per capita per day.

Five Day BOD -

Raw Sewage	-	250 PPM
Removal	-	35%

Suspended Solids -

Raw Sewage	-	200 PPM
Removal	-	55%

PRIMARY TREATMENT

Grit Removal

Aerated grit chamber with four inch air pump to remove grit from hopper into decanting trough.

One unit - 10' x 9' x 8'6".
Volume - 4,775 gallons.

Screening

Bar screen on by-pass channel.

Primary Sedimentation Tanks

Two rectangular units - size 52' x 16' x 12'.

Volume - 125,000 gallons (total).

Retention at Design - 2.5 hours.

Surface Settling Rate - 600 gallons per square foot per day.

Weir Overflow Rate - 7,800 gallons per lineal foot of weir per day.

Sludge Collectors - Jeffery Manufacturing Company Limited.

Longitudinal Sludge Collectors - Manually operated scum trough.

OUTFALL WORKS

850 feet of 30 inch concrete pipe.

The outfall sewer also acts as a chlorine contact chamber.

DIGESTION SYSTEM

Two cylindrical units - 28 feet in diameter and 23 feet high.

Volume - 27,000 cubic feet.

Digester Loading - 2.25 cubic feet per capita.

1.31 pounds of solids per cubic foot per month.

Primary digester contents agitated by gas recirculation.

DUNDAS STREET PUMPING STATION

Unit No. 1 - 15 HP Westinghouse motor.

Fairbanks Morse pump - 700 IGPM @ 39 TDH.

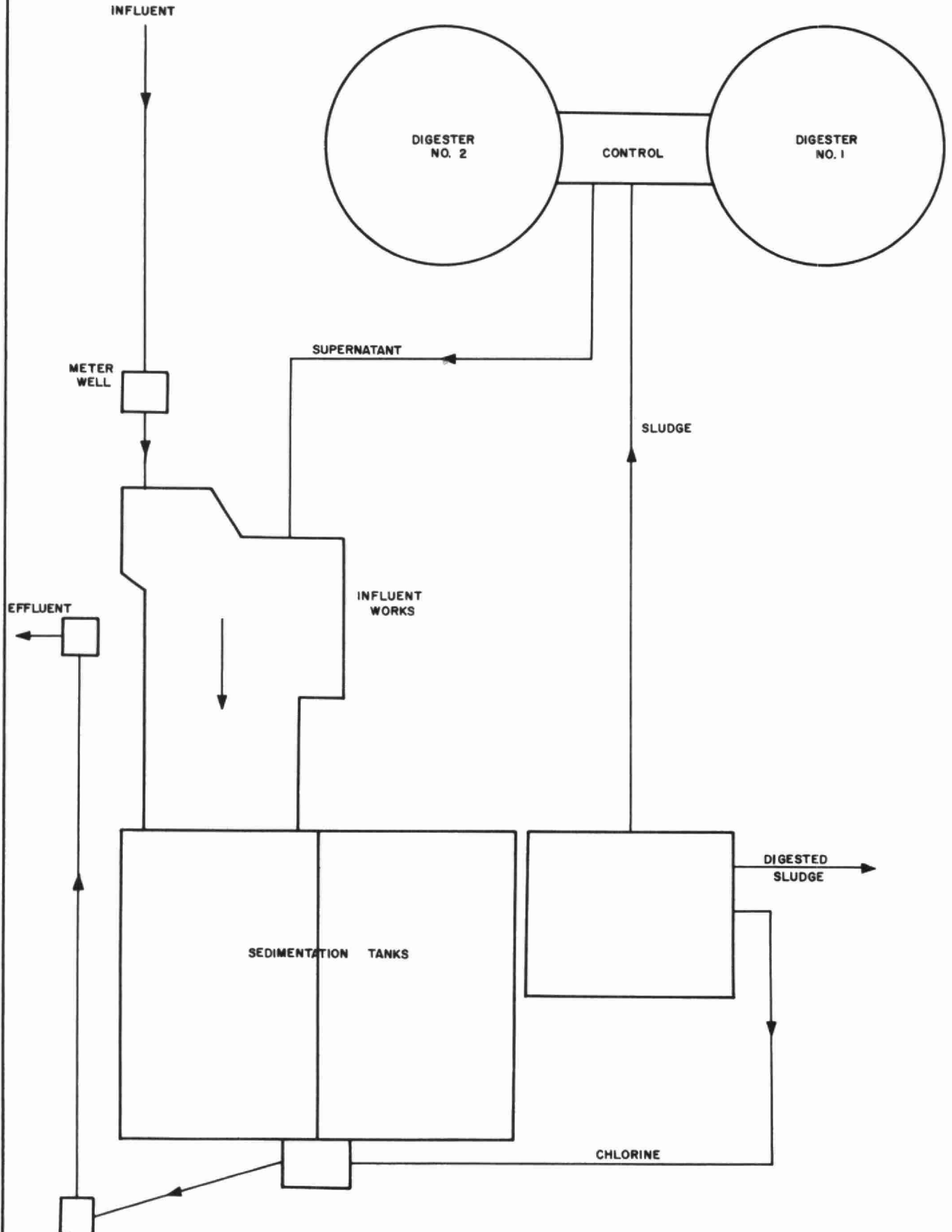
Unit No. 2 - 40 HP Westinghouse motor.

Fairbanks-Morse pump - capacity 1740 IGPM @ 48 TDH.

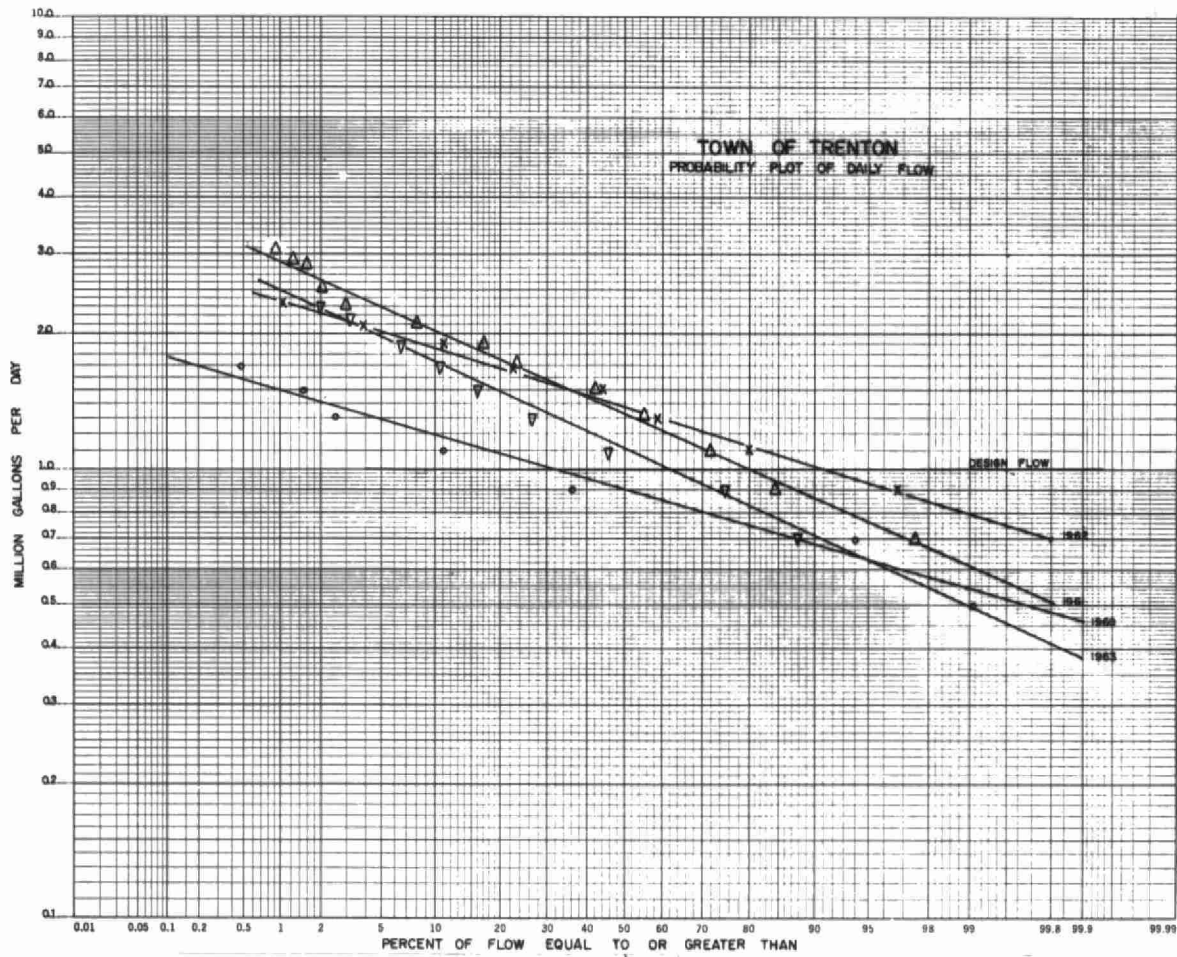
Unit No. 3 - Cummins diesel motor BHP 85 @ 1800 RPM.

Fairbanks-Morse pump - capacity 3130 IGPM @ 687 TDH.

GENERAL LAYOUT OF TRENTON PLANT



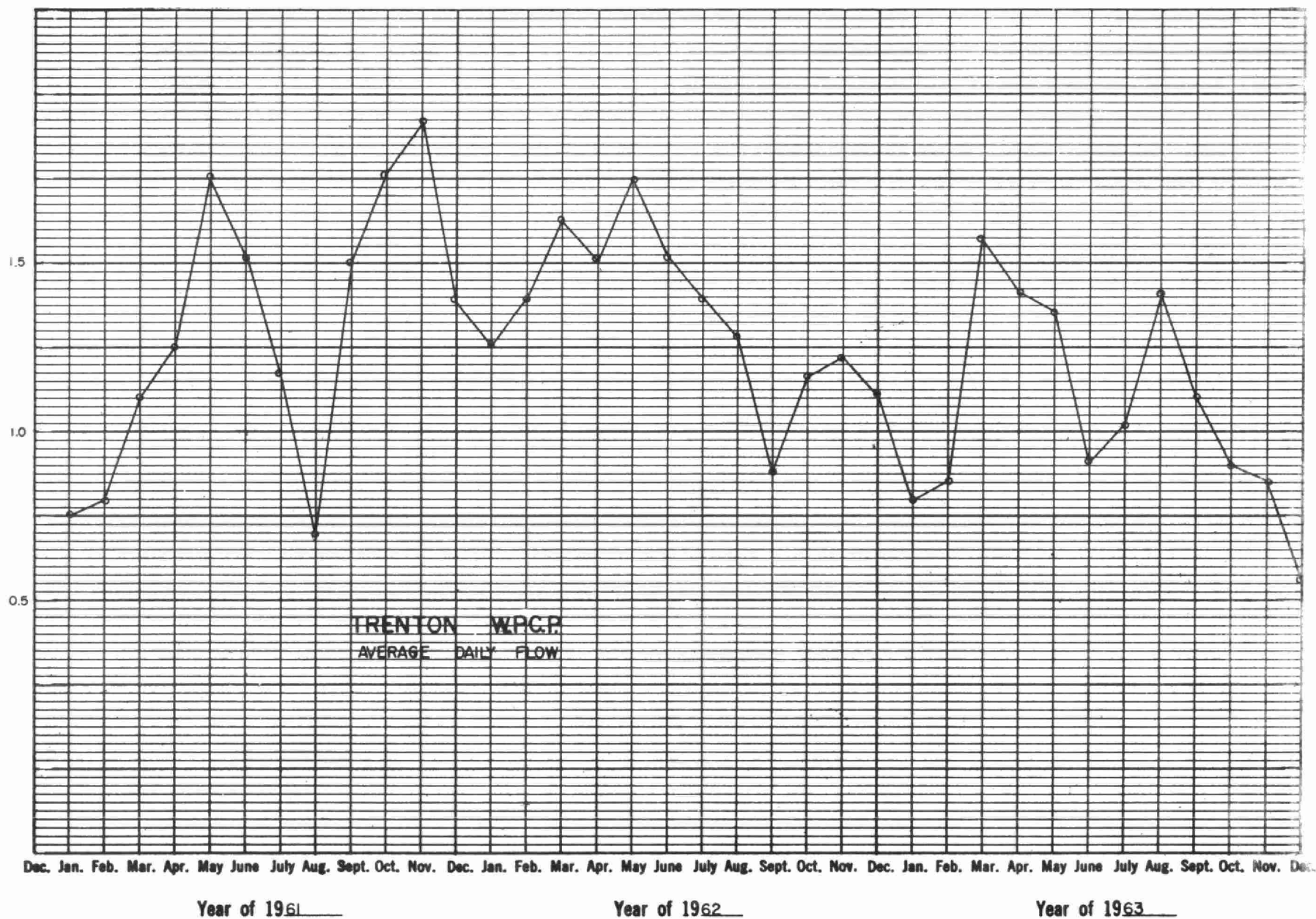
Process Data

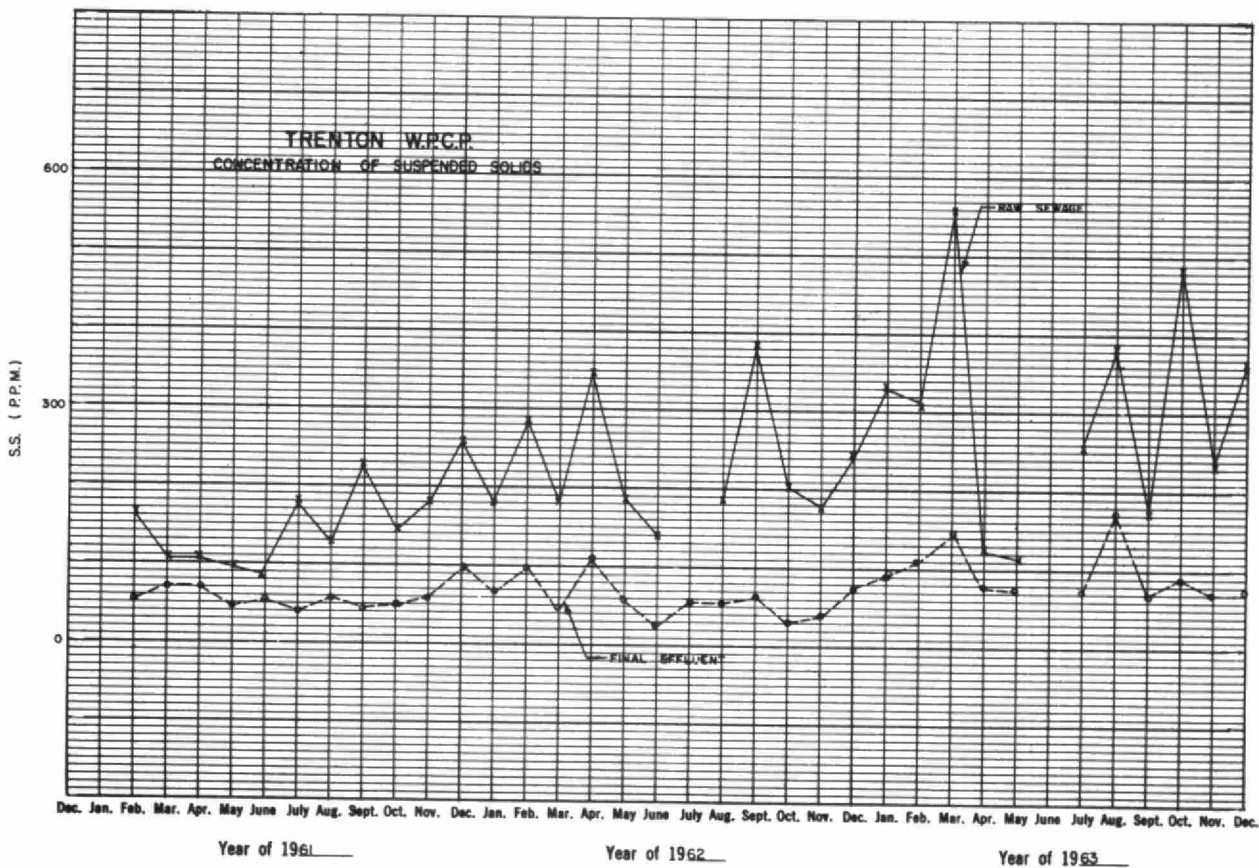
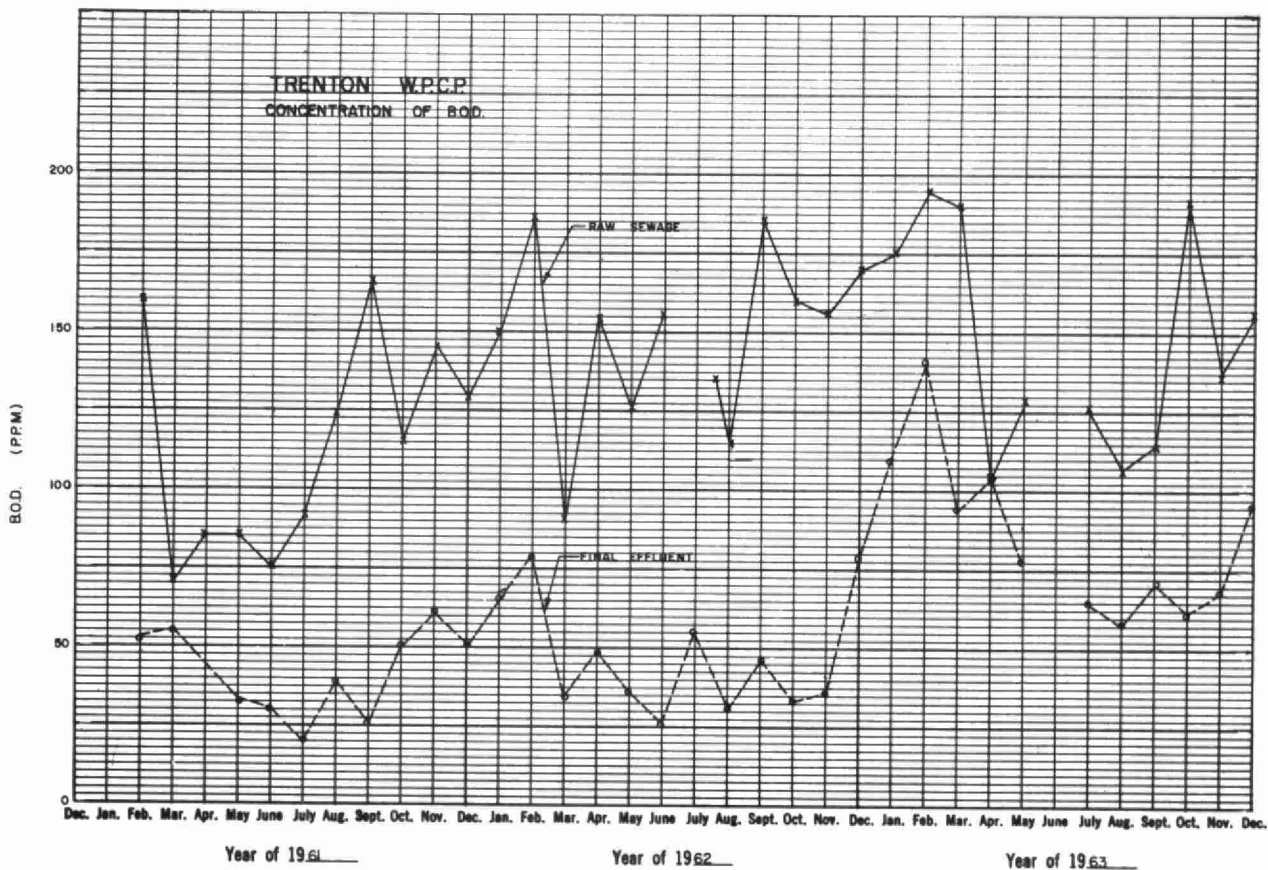


FLOW

From the probability curves, it is noted that a considerable increase in flow occurred in 1961 from the previous year of 1960. This could be caused by a greater rainfall during the year 1961. The 1962 curve is similar to the 1961 curve except that the slope has decreased. This could be caused by a program in the separating of storm and sanitary sewers. The 1963 flow curve is again lowered from those of 1961 and 1962. The cause could be contributed to the relatively dry weather experienced.

AVERAGE DAILY FLOW IN MILLION GALLONS





GRIT, B.O.D AND S.S. REMOVAL

MONTH	B. O. D.				S. S.				GRIT REMOVAL CU. FT.
	INFLUENT PPM.	EFFLUENT PPM.	% REDUCTION	TONS REMOVED	INFLUENT PPM.	EFFLUENT PPM.	% REDUCTION	TONS REMOVED	
JAN.	175	110	37	7.85	331	90	73	29.50	61
FEB.	195	140	28	6.55	318	109	66	24.85	26
MAR.	190	92	52	23.75	558	145	74	99.25	155
APR.	104	108	-	-	119	76	36	9.10	93
MAY	128	78	39	10.35	114	71	38	8.90	90
JUNE									
JULY	124	64	49	9.30	252	69	73	28.47	68
AUG.	105	58	45	10.35	374	168	55	45.37	142
SEPT.	138	70	49	10.96	172	67	61	16.93	74
OCT.	190	60	69	18.01	480	88	82	54.31	22
NOV.	134	68	49	8.20	234	71	70	20.25	65
DEC.	155	98	37	4.84	360	70	81	24.66	57
TOTAL				110.16		1024		361.59	853
AVG.	137	79	39	9.18	276	85	59	30.13	71

INFL. - INFLUENT OR RAW WASTE
EFFL. - EFFLUENT OR FINAL PRODUCT

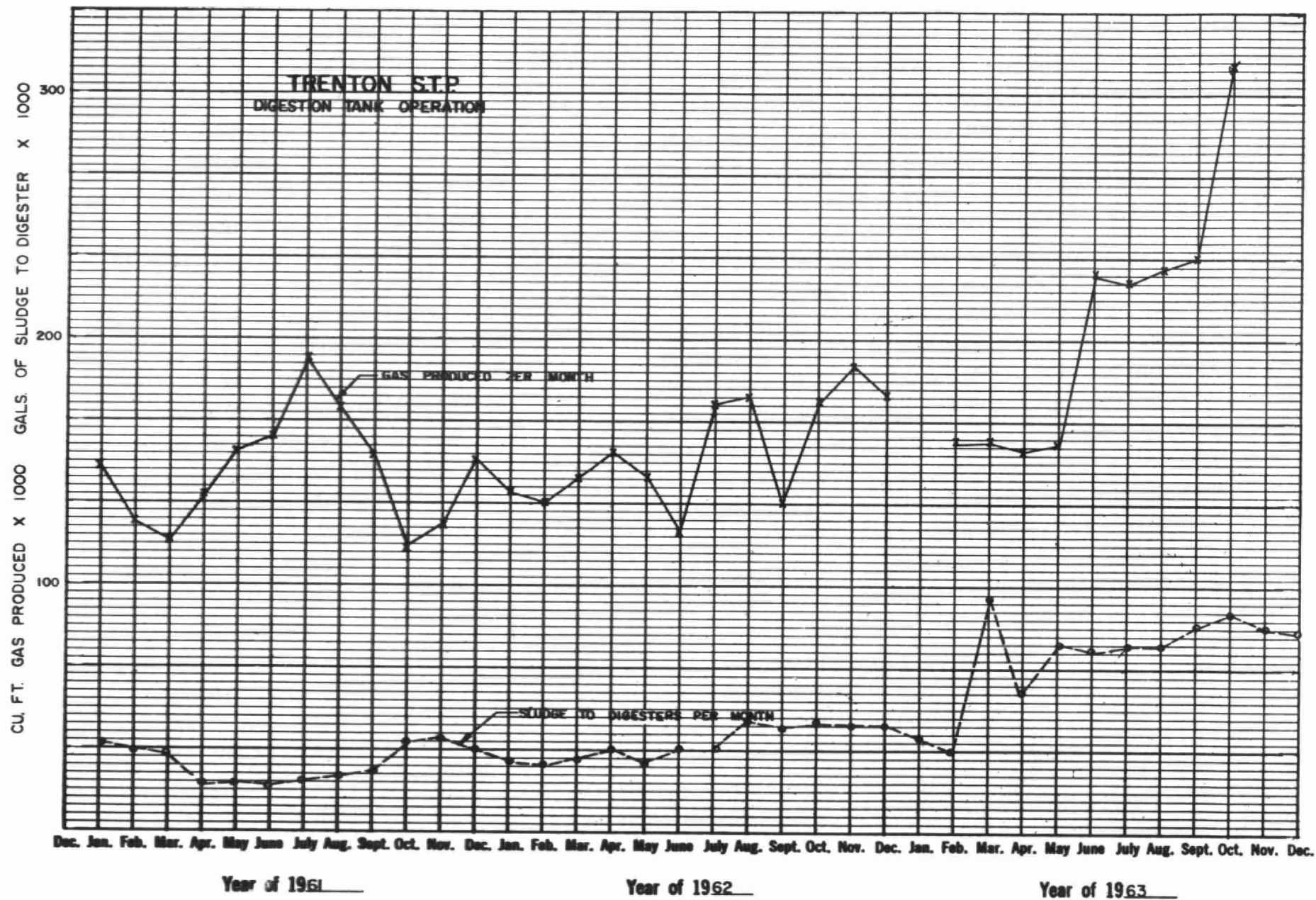
P.P.M. - PARTS PER MILLION
S.S. - SUSPENDED SOLIDS

COMMENTS

The waste received at the plant in 1963 had an average BOD of 137 PPM. The average BOD removed at the plant was 39 percent, resulting in an effluent with an average BOD of 79 PPM.

The waste contained an average of 276 PPM of suspended solids. The average removal of suspended solids was 59 percent resulting in an average effluent of 85 PPM of suspended solids.

The reductions obtained are satisfactory for a primary treatment plant. An average of 71 cubic feet of grit was removed per month. This would indicate a large percentage of combined sewers.



DIGESTER OPERATION

MONTH	SLUDGE TO DIGESTERS			% VOL. MAT IN DIGESTED SLUDGE	GAS PRODUCED 1000'S CU. FT.	SLUDGE FROM DIGESTER 1000'S GALS
	1000'S GALLONS	% SOLIDS	% VOL. MAT.			
JAN.	37.2	5.0	76	40	-	-
FEB.	33.6	3.4	83	42	158.4	-
MAR.	95.8	7.7	61	41	158.4	-
APR.	56.7	4.1	41	42	155.8	15.0
MAY.	74.4	2.1	76	41	157.5	16.0
JUNE	72.0	-	-	-	224.2	24.5
JULY	74.4	3.9	59	48	226.1	19.5
AUG.	79.2	9.5	62	43	230.4	10.5
SEPT.	86.4	1.5	73	45	232.6	12.0
OCT.	89.2	8.0	39	40	316.3	-
NOV.	86.4	1.3	77	-	-	10.5
DEC.	80.1	1.5	80	40	-	10.0
TOTAL	865.4	-	-	-	1859.7	118.0
AVG.	72.1	4.4	66	42	206.6	14.8

* VOL. MAT. - VOLATILE MATTER

COMMENTS

During 1963, 865,400 gallons of sludge with an average concentration of 4.4 percent solids were pumped to the digesters. The raw sludge contained an average of 66 percent volatile matter which amount to 251,000 pounds of volatile solids. The digested sludge produced during 1963 was 118,000 gallons. The digested sludge had an average concentration of 19.2% and contained an average of 42 percent volatile matter, this is 3000 pounds of volatile solids. The amount of volatile solids destroyed was 248,000 pounds.

The total amount of sewage gas produced in 1963 is not available because of meter problems in November and December. However, at an average monthly gas production of 206,600 cubic feet, the total gas production for the year would be approximately 2,479,000 cubic feet. This would be approximately 10 cubic feet of gas produced per pound of volatile matter destroyed.

CHLORINATION

MONTH	PLANT FLOW (MG)	POUNDS CHLORINE	DOSAGE RATE (PPM)
JANUARY	24.5		
FEBRUARY	23.8		
MARCH	48.1		
APRIL	42.4		
MAY	41.4	1039	4.85
JUNE	27.1	1729	6.38
JULY	31.1	1699	5.46
AUGUST	44.1	1516	3.44
SEPTEMBER	32.3	1428	4.42
OCTOBER	27.7	245	5.51
NOVEMBER	24.9		
DECEMBER	17.0		
TOTAL	384.0	7656	-
AVERAGE	320	1276	5.01

COMMENTS

The chlorination period was from May 15th to October 15th. A residual of 0.5 PPM was maintained to reduce the bacterial count in the final effluent.

1963

PLANT

Total Operating Costs

MONTHLY

MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICAL	GENERAL SUPPLIES	EQUIPMENT	REPAIRS & MAINTENANCE	SUNDRY	WATER
JAN	379.40	351.92		6.24			16.49			4.75	
FEB	836.01	348.04		90.84	214.31		77.96		33.45	36.14	35.27
MARCH	1,301.63	335.43		77.85	187.52		36.74			637.53	26.56
APRIL	742.25	361.62		64.01	200.15		25.16		25.62	32.36	33.33
MAY	889.53	377.14			241.35		73.20			155.29	42.55
JUNE	1,795.41	336.40	173.94		216.75	688.83	172.09		149.16	25.80	32.44
JULY	1,793.54	492.96	235.91		218.73	588.05	103.36			24.72	129.81
AUG	1,665.98	348.04			189.26	868.05	112.40			28.02	120.21
SEPT	853.26	328.64			216.98		59.64	86.95	7.31	28.22	125.52
OCT	131.65	328.64			199.42	- 560.00 *	26.22			18.02	119.35
NOV	339.09	357.40			173.93	- 420.00 *	55.53			74.93	97.30
DEC	1,376.67	668.19		63.50	393.65		53.68		83.51	37.48	76.66
TOTAL	12,104.42	4,634.42	409.85	302.44	2,452.05	1,164.93	812.47	86.95	299.05	1,103.26	839.00

* INDICATES CREDIT

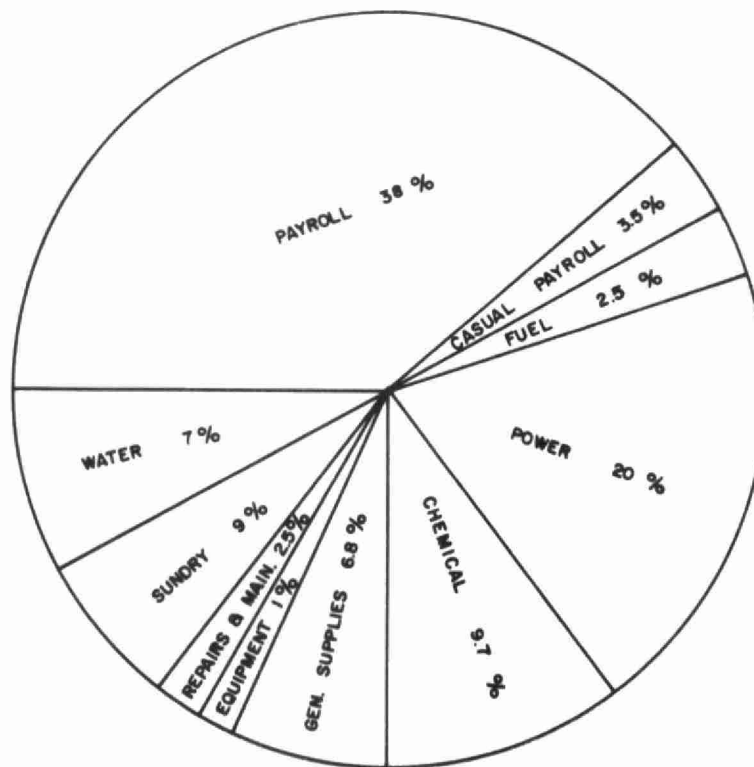
PLANT

YEARLY

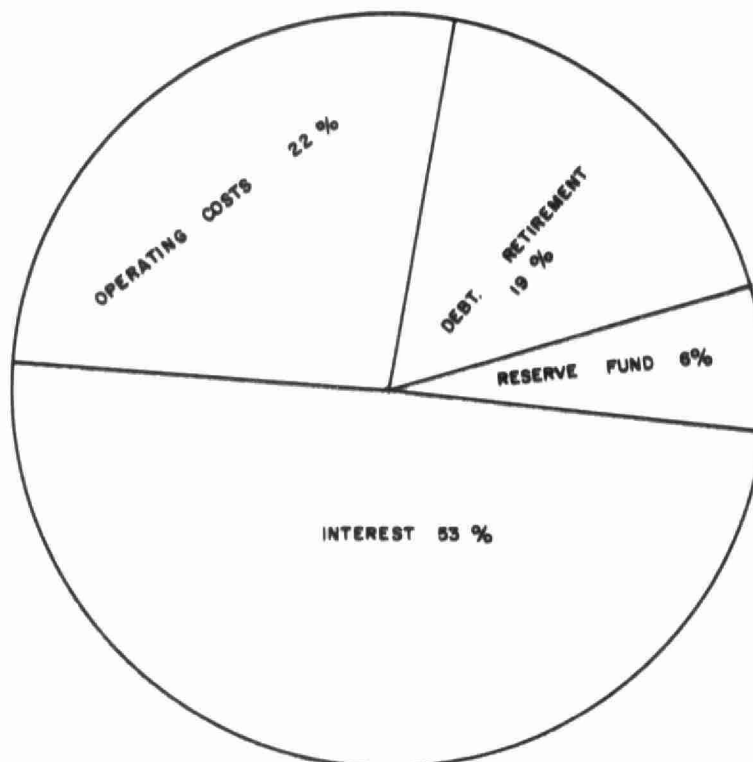
YEAR	M.G. TREATED	TOTAL COST	COST PER MILLION GALLONS	COST PER CAPITA PER YEAR
1961	342	12,372.13	36.20	\$0.94
1962	496	12,577.44	25.35	\$0.95
1963	384	12,104.42	31.52	\$0.92

1963

OPERATING COSTS



TOTAL ANNUAL COST



SUMMARY

This report contains data of flows, BOD loadings, suspended solids loadings and costs for the year 1963. The removal obtained at the plant was satisfactory for a primary treatment plant. Sludge digestion was also good this year and produced approximately 2.5 million cubic feet of gas.

The plant personnel conducted the operation of the plant and pumping station in a very satisfactory manner.

RECOMMENDATIONS

An examination of the average daily flows indicates that the design flow of one million gallons per day is frequently exceeded. It is, therefore, recommended that steps be taken to enlarge the present facilities and to continue the program of separating the storm water from the sanitary sewers.



Total 1963 Costs

The total cost to the municipality during 1963 was as follows:

Operating.....	\$ 12,104.42
Debt Retirement.....	\$ 10,402.00
Reserve.....	\$ 3,556.00
Interest.....	<u>\$ 29,040.68</u>
TOTAL.....	<u>\$ 55,103.10</u>

On the basis of the population of 10,000 the total annual cost of the Trenton Sewage Treatment Plant was approximately \$5.51 per person.

The amount in the reserve fund on December 31, 1963 was \$17,111.39.



Division of Plant Operations

ONTARIO WATER RESOURCES COMMISSION
801 BAY ST. TORONTO 5